The Current State of Affairs
A DOT&E Perspective

August 23, 2000

Honorable Philip E. Coyle
Office of the Secretary Of Defense
Director, Operational Test and Evaluation

Overview

- T&E Workload

- Resource Trends

- Congressional Feedback

- Board of Director's Strategic Planning Initiative

- Sustainable Ranges

- The New DoD Systems Acquisition Process

T&E Workload

- Modernization continues to generate significant workload

- IPTs and early involvement increase workload

- Increasing complexity of weapon systems

- Increasing scope of test programs

  - Expanded need for interoperability testing

  - Increasing demand for verifying Information Assurance (IA)

 - Increasing effort in testing for Electromagnetic Environmental Effects

Army Operational Test and Evaluation

- Military workforce cut 60% FY90-99

- Civilian workforce cut 11% FY90-99

- Workload up 121% FY93-01

- Currently fund $20.5 (46%) of $44.9M required to execute ACAT II - IV operational tests, critical FY01 shortfall is $8.7M to fund to $29.5 (65%) execution experience level

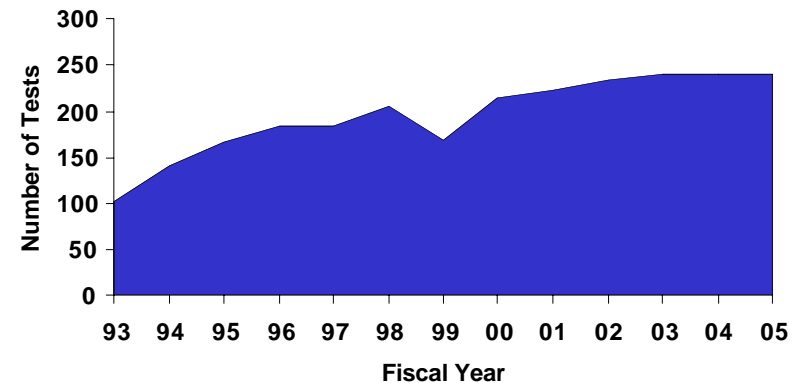- Impact:

  - Cannot fund 39 ACAT II - IV FY01 operational tests, critical FY01 shortfall is $8.7M

  - Cannot fund 4 FOT&E programs, critical FY01 shortfall is $7.5M

Manpower Profile
Overall reduction of -28%

FY90-99 Change

- 1.7%
- 11%
- 60%

Military   Civilian   Contractor
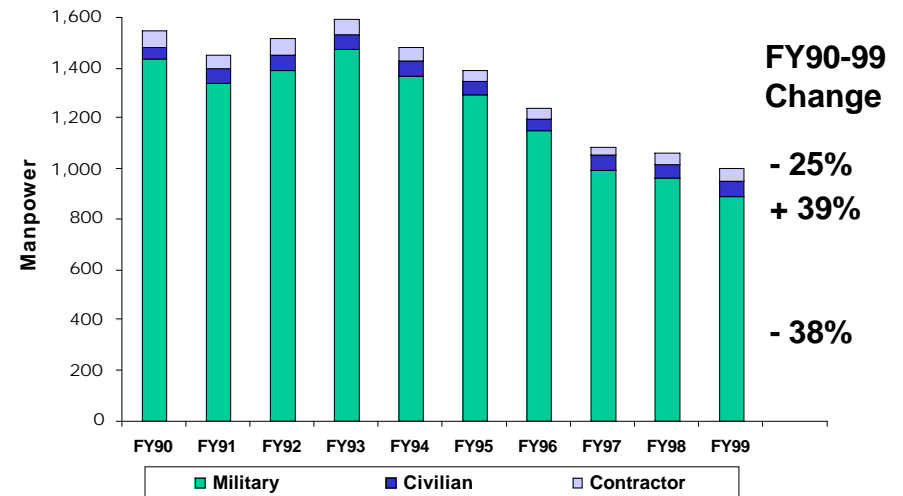
Workload

Fiscal Year
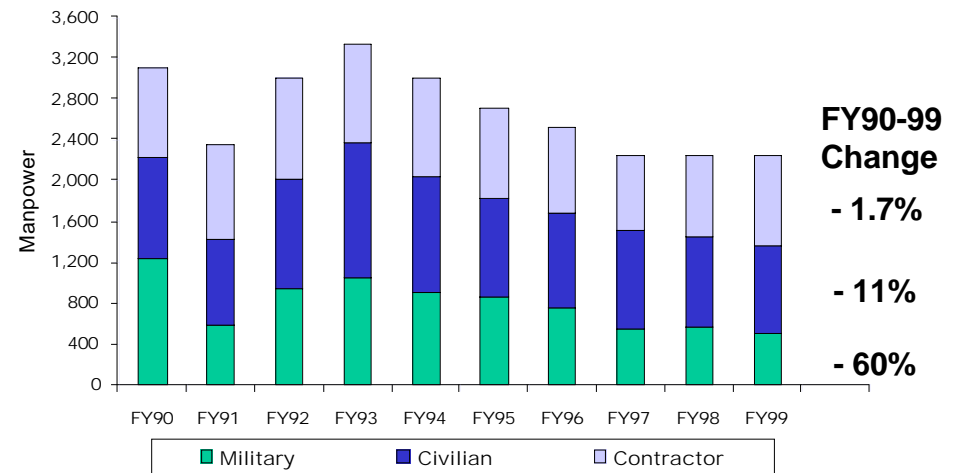
Navy Operational
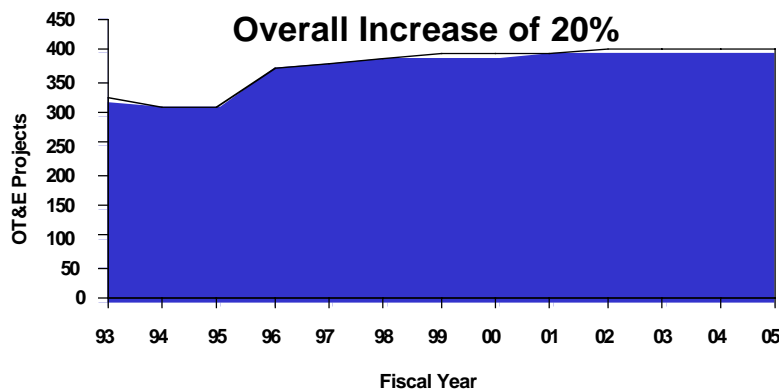# Test and Evaluation Command

- Workload higher than at any other time in its 55 year history

- FY01 funding down 10% from FY93

- All operational test costs (except travel) funded by acquisition programs

- Early involvement of operational testers funded by acquisition programs that benefit or it does not tend to happen

Manpower Profile
Overall reduction of -35%

FY90-99
Change

- 25%
+ 39%

- 38%

Legend: ■ Military ■ Civilian □ Contractor

(1) Includes VX squadrons

Workload

Overall Increase of 20%

OT&E Projects axis: 0, 50, 100, 150, 200, 250, 300, 350, 400, 450
Fiscal Year: 93 94 95 96 97 98 99 00 01 02 03 04 05

Funding
Operational Test and Evaluation Capability
P.E. 0605865N

FY01 $ Millions axis: 0, 2, 4, 6, 8, 10, 12
Fiscal Year: 93 94 95 96 97 98 99 00 01 02 03 04 05
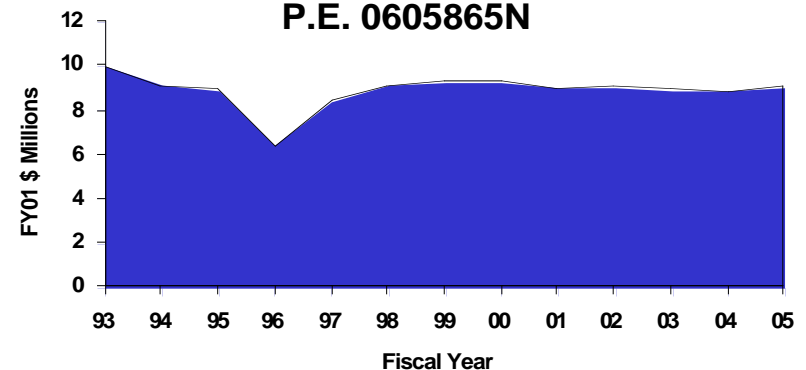
Marine Corps Operational Test and Evaluation Agency

- Decreasing personnel levels to accomplish increasing workload

- OT&E of AIS not supported until POM 02

- 25 potential AIS OT programs to prioritize based on available resources

- Insufficient resources to meet NBC OT requirements
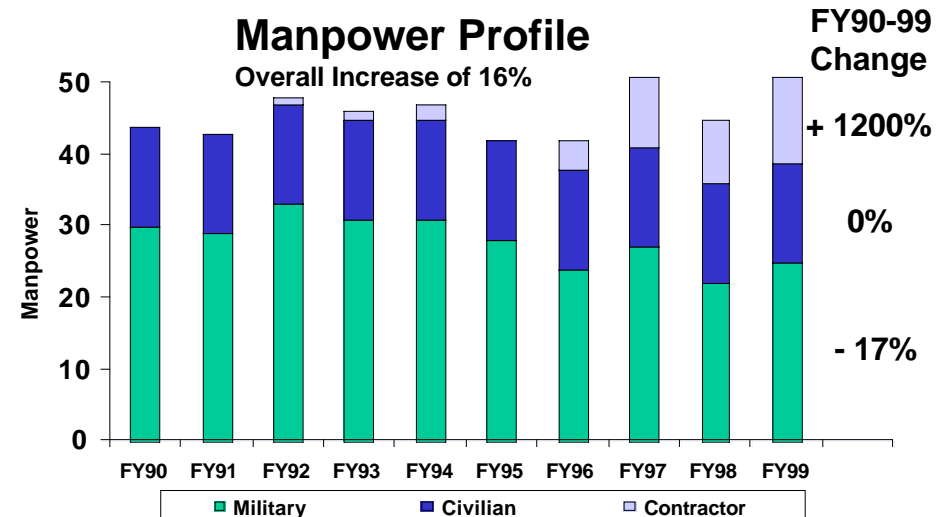
Manpower Profile
Overall Increase of 16%

FY90-99 Change

+ 1200%

0%

- 17%

Military ■ Civilian □ Contractor

MCOTEA Workload

■ Total Workload ■ Y2K Workload

Trend Line

MCOTEA Funding

Budget Funds ■ Y2K

Projected Baseline
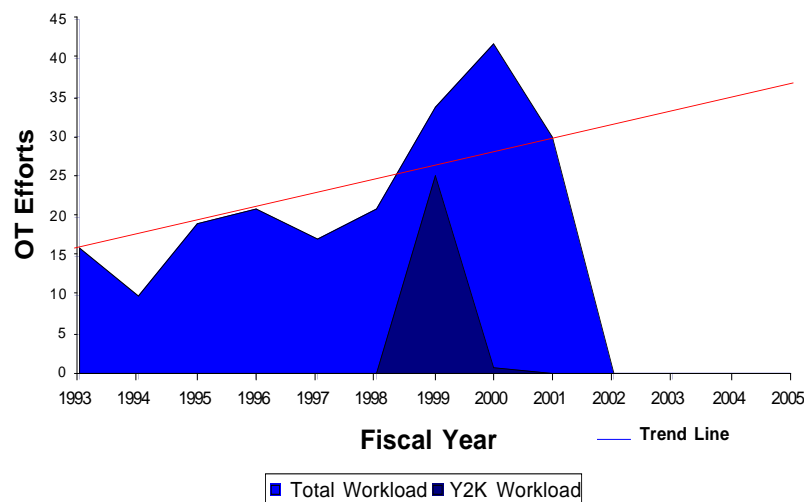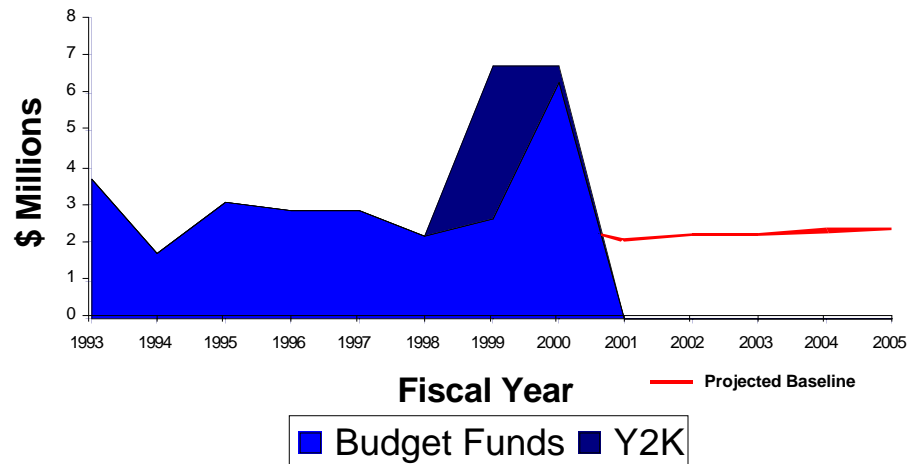
Air Force Operational Test and Evaluation Command

- FY01 budget request does not fully fund operational test requirements
- 20 of 49 test programs at risk including:
  - Milstar II
  - Advanced Strat. & Tact. IR Expendable
  - Miniature Air Launch Decoy
- Impact:
  - FY01 RDT&E critical shortfall is $2.6M due to spike in range costs for OT&E programs
  - FY02 Shortfall between $4-9M

Manpower

Overall Increase of 27%

Military | Civilian | Contractor

FY90-99 Change
+ 216%
- 1%
+ 6%

Workload

Overall increase of 200%

OT Efforts vs Fiscal Year (94–05)
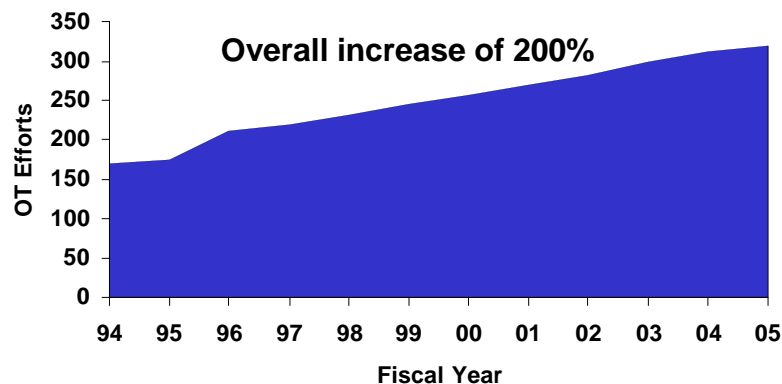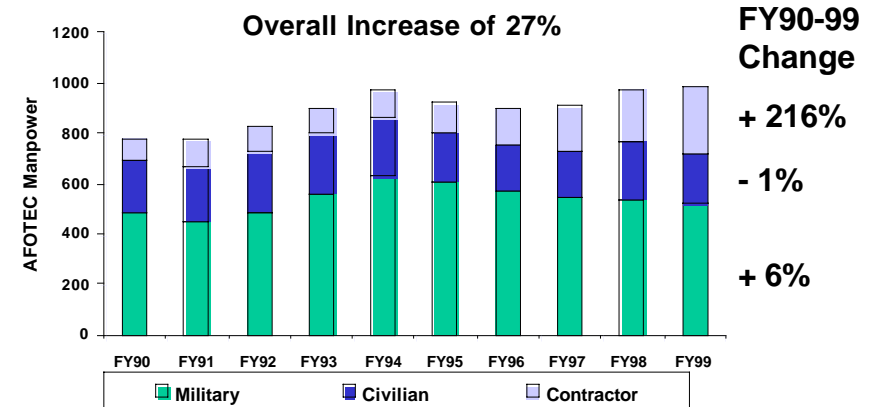
AFOTEC Funding
Initial Operational Test and Evaluation
P.E. 0605712F

FY01 $ Millions vs Fiscal Year (93–05)
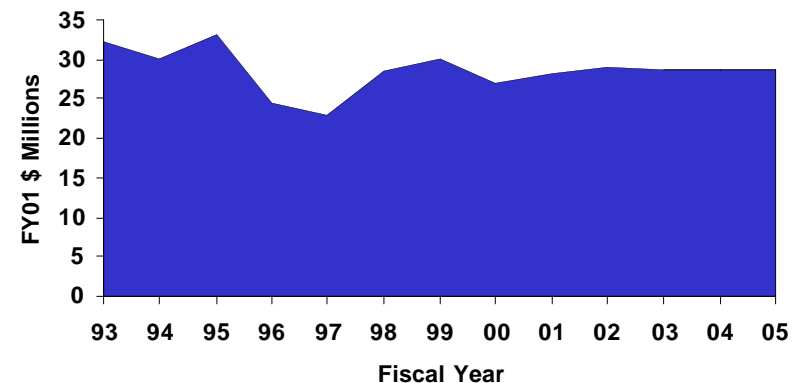
OTA Demographic Study
Results Overview (FY90-99)

- **Size**: OTA workforce downsized 31%
  - 40% military reduction, 8% civilian reduction
  - Contractor workforce increased 15%
  - Net workforce decrease of 22%
- **Aging**: Minimal infusion of junior civilian professionals
  - More than 50% of civilian professional workforce over 50; (34% of GS-7/GS-15 personnel retirement eligible by 2004)
  - Only 12% under age 40
- **Occupational Mix**:
  - Military: Substantial decrease in Tactical Operations Officers
  - Civilian: Increases in Scientists & Professionals and Administrators categories.
- **Composition**: Fewer military - more contractors.

DoD and OTA Workforce Trends (FY90-FY99)

FY90-99 Reduction (Mil&Civ):
DoD: 32% (32% Mil / 32% Civ)
OTAs: 31% (40% Mil / 8% Civ)

OTA Military

DoD Military

OTA Civilian

DoD Civilian

DoD Manpower — 2,500,000 / 2,000,000 / 1,500,000 / 1,000,000 / 500,000 / 0

OTA Manpower — 3,500 / 3,000 / 2,500 / 2,000 / 1,500 / 1,000 / 500 / 0

FY90 FY91 FY92 FY93 FY94 FY95 FY96 FY97 FY98 FY99

■ DoD Military   ■ DoD Civilian   ◆ OTA Military   ◆ OTA Civilian
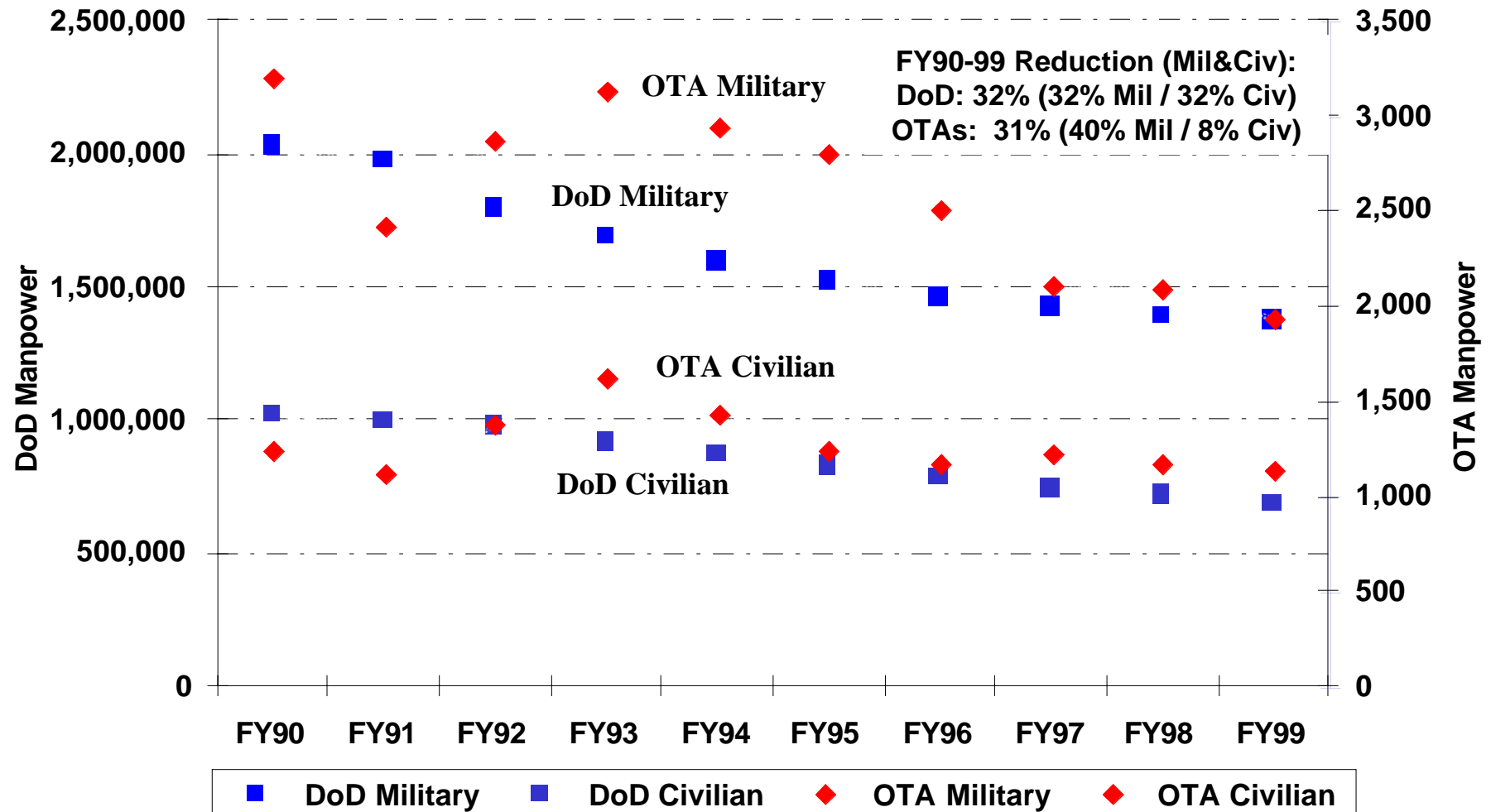
Reductions in All Elements of MRTFB Workforce

Stacked area chart. Y-axis: Man-Years (0 to 50,000). X-axis: Fiscal Year (90 to 01). Areas from bottom to top: Military, Civilian, Contractor.

Change FY90-01

Element	Change	Percent
Contractor	-12,747	-29%
Civilian	-3,505	-17%
(Civilian lower)	-4,972	-39%
Military	-4,270	-44%
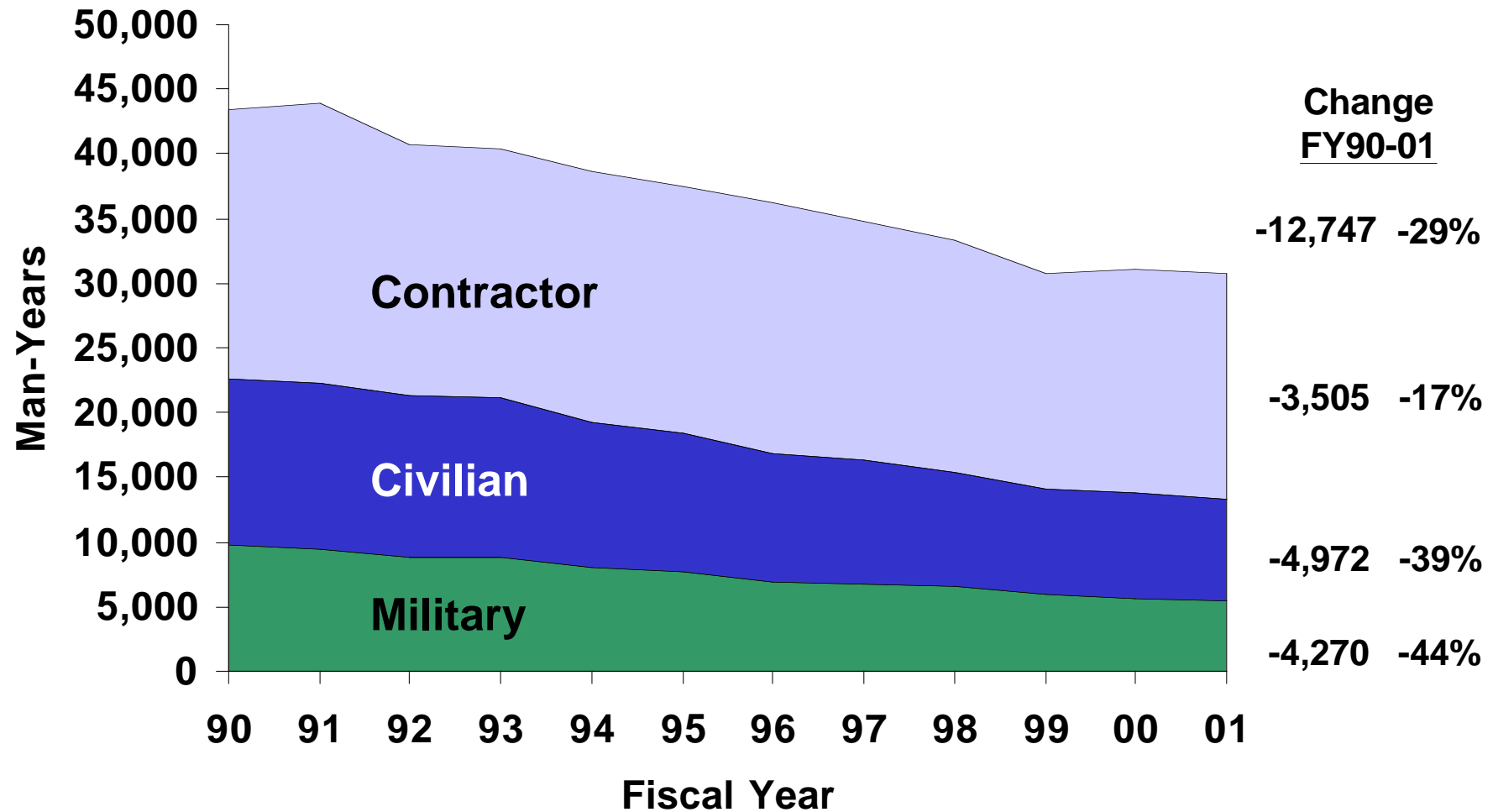
MRTFB Funding
Reduced Significantly

Change FY90-01
-$1.1 billion (-22%)

Cumulative FY90-01 Reduction excluding user funds = $7.9B

Investment

Military Personnel

T&E Institutional Operations

User (Customer) Funds

- $420M (-38%)

- $320M (-52%)

- $340M (-20%)

- $30M (-2%)

FY01 $ in Billions

90 91 92 93 94 95 96 97 98 99 00 01

Fiscal Year
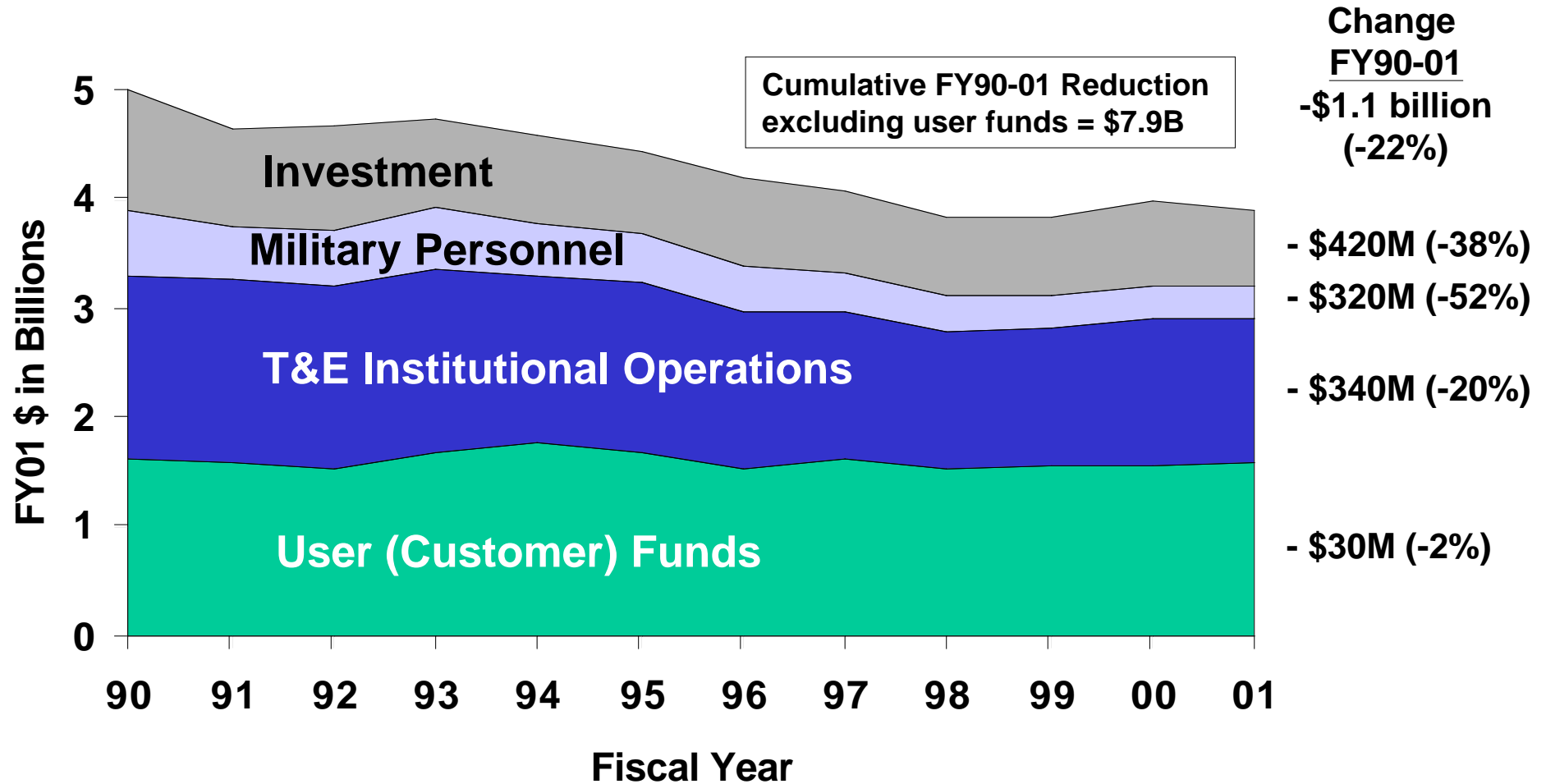
RDT&E T&E Investment Funding Reduced

FY90 Total $621M

29.5% Reduction since FY90

FY01 President's Budget Request $438M*

FY90 pie chart:
- Service I&M — 221.5
- OSD Investment — 100.8
- Service Threat Simulators — 187.6
- Service Targets — 111.4

FY01 pie chart:
- Service I&M — 175.8
- OSD Investment — 122.4
- Service Threat Simulators — 85.5
- Service Targets — 54.7
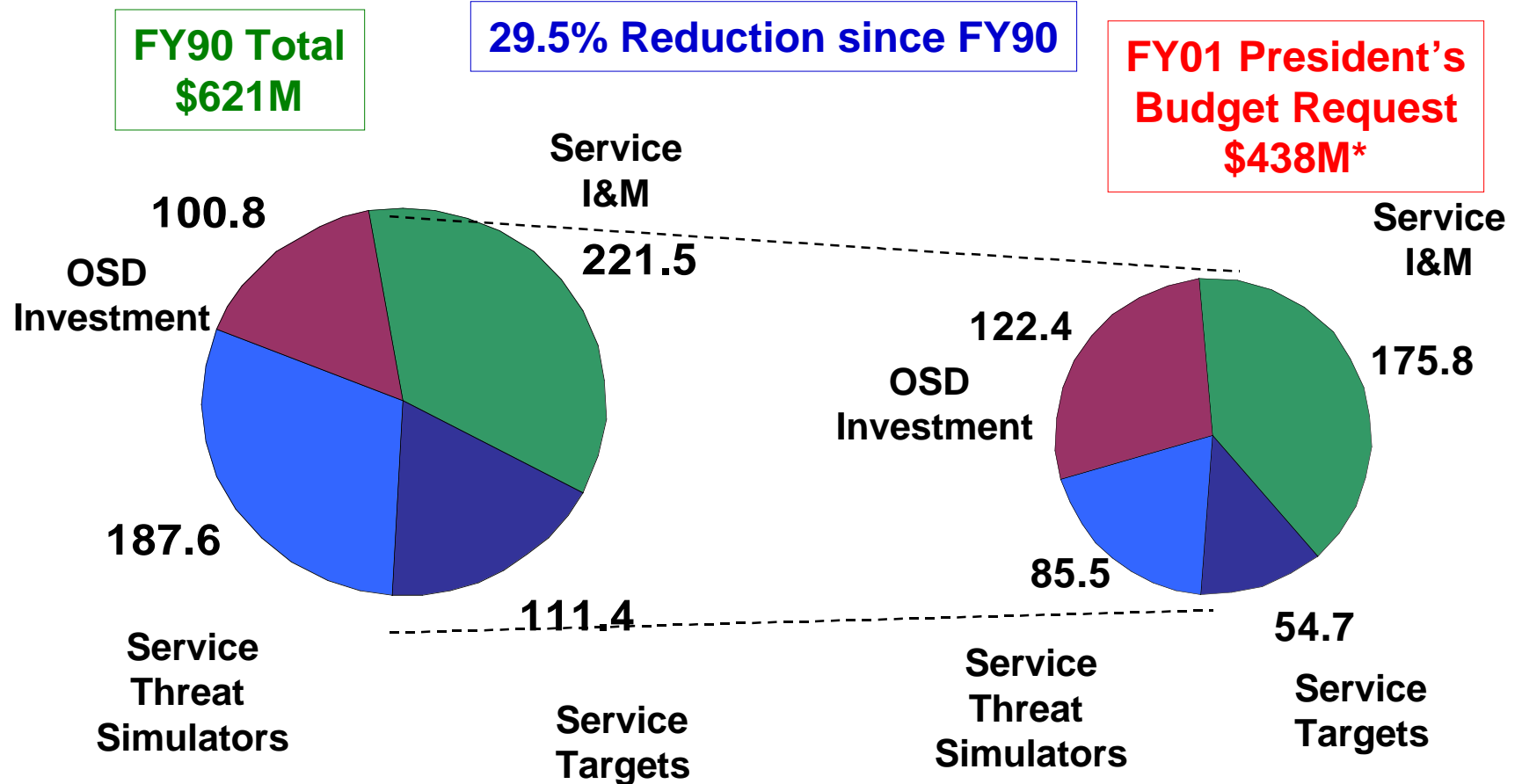
* The FY01 Defense Appropriation Act added $53 million to the request.

*RDT&E Funding (FY01 $)
Includes T&E Investment, Targets and Threat Simulators; excludes Military Construction and Procurement

Resource Enhancement Project (REP)

- **Mission:**
  - ➤ Ensure That Service and DoD Agency Acquisition Programs Are Provided the Resources to Test in Most Realistic Operational Environment

- **Criteria:**
  - ➤ Unforeseen Requirements That Preclude Service/Agency Programming and Budgeting
  - ➤ Support Near Term (Usually 2 Years) High Priority OT&E Requirements
  - ➤ Responds to Late Breaking Test Issues, New Technologies, Changes in Threat and Foreign Military Utilization (FMU) Opportunities
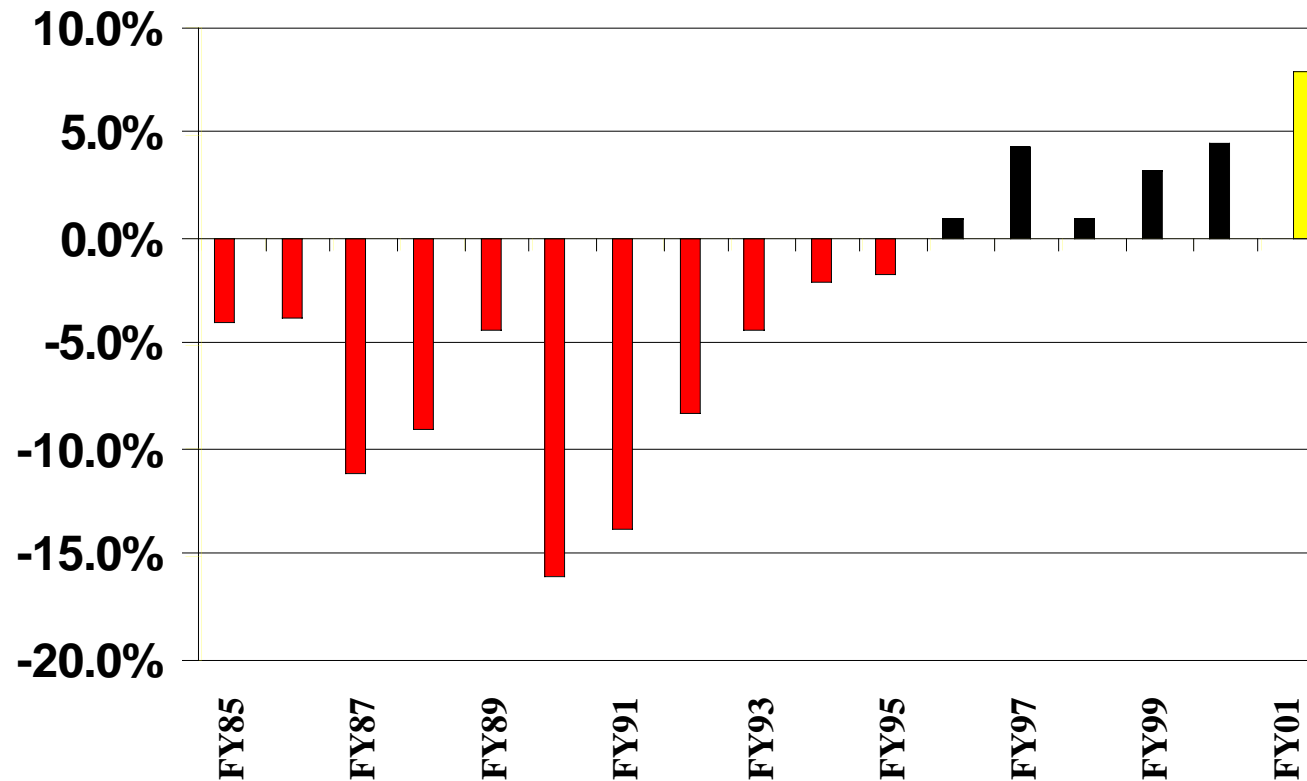
- DOT&E Vision is for REP to Support OT Community Needs **(Looking for Feedback)**

Congressional Actions
T&E Related - RDT&E Program Elements

Change From Request

FY01
HAC +7.7%
SAC +3.4%
App Conf 7.4%
HASC +1.7%
SASC +1.5%

BUDGETING FOR OPERATIONAL TEST

"The Committee is concerned that the Military Departments are not adequately budgeting for operational testing. The Committee understands that severely constrained operational test budgets are forcing the Services' operational test communities to focus reporting only on the highest profile programs with small and medium sized programs proceeding into production without formal reporting from the operational test community. The Committee believes that this situation must be corrected and fully expects the Military Departments to budget adequately to ensure all programs benefit from an appropriate level of independent operational testing."

CLOSE COMBAT TACTICAL TRAINER (CCTT)

The HAC zeroed the procurement funding for CCTT in FY01 because of the lack of funding to conduct required FOT&E. The SAC reduced the budget request by approximately $61M. The conference settled on cutting the procurement funding by one half ($42M) because of their concern over funding for FOT&E.

(After this issue was raised on the Hill, the Army agreed to fund the FOT&E, which is being conducted this month. But the failure to properly resource the FOT&E up front cost the Service $42M in procurement funding for CCTT in FY01).

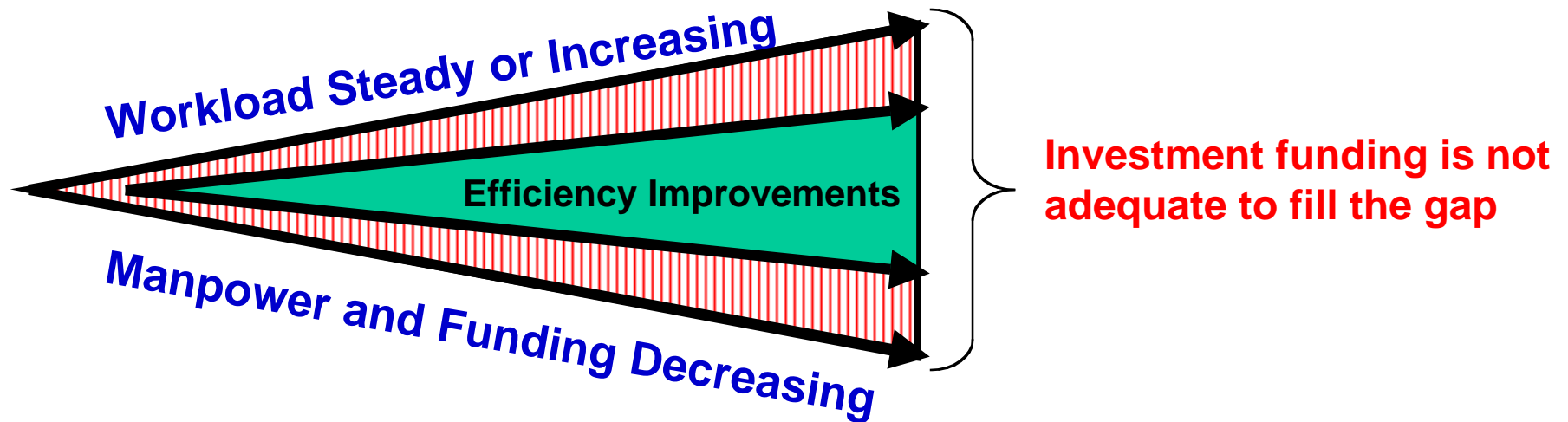## CENTRAL TEST and EVALUATION INVESTMENT PROGRAM (CTEIP)

"...the committee has serious concerns with the budget request for CTEIP. CTEIP provides critical T&E capabilities for joint and multi-service system test requirements. In this role, CTEIP provides a corporate means to leverage test investments for the services and defense agencies. This year funding decreased even though the Annual Report of the Office of OT&E for 1999 stated the clear and pressing need for new investments in the T&E infrastructure, ''. . . with its emphasis on such efforts as improving and test efficiencies, promoting increased use of modeling and simulation, creating common instrumentation, and developing capabilities for test information systems, the CTEIP is clearly focused on developing the test capabilities we will require to meet the test challenges of the next century.'' The committee recommends an increase of $20.0 in PE 64940D to be applied to critical upgrades at the defense T&E facilities as determined by the D, OT&E.

State of the T&E Infrastructure

Workload Steady or Increasing

Efficiency Improvements

Manpower and Funding Decreasing

Investment funding is not adequate to fill the gap

- T&E workload is generally steady or increasing

- Resources for test and evaluation down significantly

- T&E Centers are focused on increasing efficiency

- Investment is not keeping pace with technology

- Acquisition programs are being impacted

Board of Directors (BoD)
Strategic Planning Initiative

Vision: Provide -- to the world's best testers -- T&E capabilities that thoroughly and realistically test and evaluate weapons and support systems

Mission: Provide world class support to acquisition programs and decision makers, within the full spectrum RDT&E infrastructure, to ensure effective and suitable systems are fielded, while continuing to be responsible stewards of the environment

BoD Strategic Planning

- **Goal 1**: Provide and maintain an experienced, trained, flexible, multi-skilled government civilian, military, and contractor workforce; continuously infused with new talent; to meet the T&E needs of the DoD.

- **Goal 2**: Cause the modification of the Defense Acquisition University curriculum to provide PM and PEO a more complete appreciation of the value of T&E to their programs.

- **Goal 3**: Improve T&E infrastructure management and investments to ensure facilities and equipment keep pace with the technical demands of the systems to be tested, improve the ability to execute T&E programs efficiently and economically, and to improve working conditions for T&E personnel.

- **Goal 4**: Develop effective T&E standards, policies, and processes which are consistent across the Services including cost visibility and pricing/costing practices.

BoD Strategic Planning

- **Goal 5:** Establish policies, facilities, practices to test and evaluate increasingly complex and rapidly evolving information technologies that will characterize future systems especially information assurance and interoperability.

- **Goal 6:** Require the early involvement of the OTAs in development programs in order to (1) provide the PM with early insights into operational issues which may be inherent in the system and (2) to encourage the execution of the combined DT/OT where appropriate while maintaining the independence of the operational evaluation.

- **Goal 7:** Continue to be responsible stewards of the environment provided for T&E use on the land, in the air, on/under the sea, and in space.

- **Goal 8:** (NEW) Develop strategic partnerships with program managers, other governmental agencies, industry, and academia to establish superior T&E of weapon systems.

BoD Strategic Planning Initiative Proposed Schedule

- Mar 00 -- Oct 00   Multiple Off-site Meetings

  - March 15-16, 2000

  - July 12, 2000

  - September 22, 2000

- Aug 00 -- Jan 01   ES/ESS Refines Product

- Nov 00   BoD Reviews Product

- Oct 00 -- Mar 01   ESS/TRAG
  Flesh Out Strategic Guidance

- Mar 01 -- Apr 01   ESS/JPO Draft FY04 T&E
  Strategic Plan

- Apr 01 -- May 01   Strategic Plan Coordination

- Jun 01   Strategic Plan Approved

BoD Strategic Planning Initiative
The Next Steps

- SAE Off-site -- Sept 00

- Industry Off-site -- Oct 00

- Approved Plan -- Jun 01

Sustainable Ranges

Defense Planning
Guidance

Senior Readiness
Oversight Council

Increasing Resources
Needed to Ensure
Sustainable Ranges

**Defense
Test and Training
Steering Group**

Service Concerns about
Range Readiness and
Encroachment

Sustainable Ranges
Working Group

Craft Near- and Long-Term DTTSG Sustainable Range Strategy
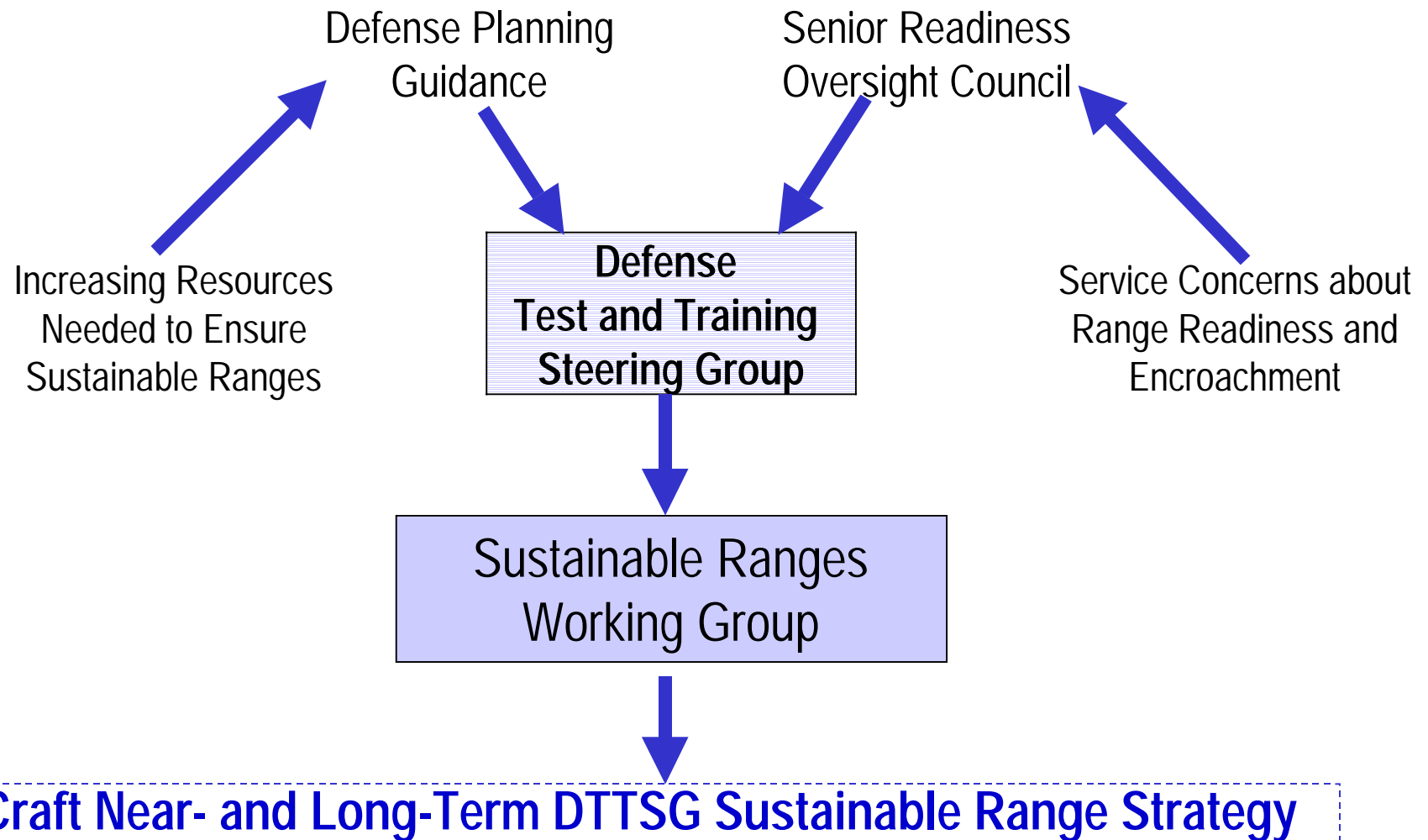
Encroachment Issues

Current Issues

- UXO/Munitions

- Airspace Restrictions

- Frequency Encroachment

- ESA (Critical Habitat)

- Air Emissions

- MMPA/Harassment

- Urban Growth

- Airborne Noise

Potential Follow-on Issues

- Space

- UXO/Munitions

- NAS Redesign/Free Flight

- Maritime Habitat (EFH, Coral Reefs)

- Water Use (CWA, Non-Point Sources)

- Cultural Resources

- Ecosystem/Biodiversity

- Land Use
  - Native American
  - Resource Extraction
  - Competitive Uses

The New DoD Systems Acquisition Process:
A DOT&E Perspective
OTA Commanders Conference

August 22-23, 2000

THE NEW 5000 MODEL

Technology Opportunities &
User Needs

- *Process entry at Milestones A, B, or C (or within phases)*

- *Program outyear funding when it makes sense, but no later than Milestone B*

Single Step or Evolution to Full Capability

A   **B**   **C**   IOC

Concept & Technology Development	System Development & Demonstration	Production & Deployment	Support

Pre-Systems Acquisition

Systems Acquisition
(Engineering Development, Demonstration, LRIP & Production)

Sustainment & Maintenance

MNS   ORD   *All validated by JROC*

Relationship to Requirements Process

Software Intensive Systems
MS III.n Approach

MS II.0

COTS SW & HW

Field to Testbed

Block 0   LUT   **MS II.I**   **MS II.M**

Representative Sample

Application SW Development

Field to Testbed

Blocks 1-M   DT/OT*   DT/OT*

Developmental Testing   Developmental Testing   Army Fielding

LUT   Block M+1   IOT&E

ASARC Level
Project Board
*if necessary

MS III.1 or IPR

Developmental Testing   Army Fielding

Block M+2   OT*

MS III.2 or IPR

Developmental Testing   Army Fielding

Block M+3   OT*

Developmental Testing   Army Fielding

Block M+N   OT

P R O T O T Y P E

MS I   **MS II**   **MS III.C** (Certification)   **MS III.F** (Final)

Representative Sample: Be Sure the System Can Stand on Its Own

Chapter 2 of DA Pamphlet 73-5

THE NEW 5000 MODEL

- **_Multiple process paths_ --** not just one way of entering systems acquisition

- **_Evolutionary acquisition_ --** based on _time-phased requirements_ - preferred (but not only) approach

- **Minimum number of _mission-oriented Key Performance Parameters_ to facilitate _cost-performance trades_**

- **Achieve _proven technology_ and a _validated ORD_ --** before beginning systems-level work at Milestone B

- **Complete _full systems_ demonstration --** before committing to low-rate production

- **Use _market research_ and _commercial products_ --** to increase competition

T&E
What's Different & What's Not

1. Formalizes the Integrated T&E Process.

2. Emphasizes T&E Involvement in S&T Activities.

3. Maintains the Same Mandatory TEMP Format.

4. Creates a Service/OSD Integrated Test Team.

5. Facilitates Involvement During Deployment

DoDD 5000.1 IT&E

Integrated Test and Evaluation. Test and evaluation is the principal tool with which progress in system development is measured. The complexity of modern weapon systems demands that test and evaluation programs be integrated throughout the defense acquisition process. Test and evaluation shall be structured to support the defense acquisition process and the user by providing essential information to decision-makers, assessing attainment of technical performance parameters, and determining whether systems are operationally effective, suitable, and survivable for intended use. Test and evaluation is conducted to facilitate learning, assess technical maturity, facilitate integration into fielded forces, and confirm performance. Test and evaluation shall be closely integrated with requirements definition, threat projections, systems design, and development, and shall support the user through assessments of a system's contributions to mission capabilities. Test and evaluation planning shall begin early in the acquisition process. Each Military Department shall establish an independent operational test and evaluation agency, reporting directly to the Service Chief, to plan and conduct operational tests, report results, and provide evaluations of effectiveness and suitability.

Integrated Test and Evaluation

- Test & Evaluation will be integrated throughout the acquisition process
    - Early, up-front involvement of T&E community in requirements process and design of an integrated test and evaluation strategy
    - Conduct early operational assessments
    - Adapt T&E approaches for Evolutionary/Spiral Developments

- Evaluation Strategy will:
    - Be prepared after Milestone A
    - Integrate T&E, M&S and analysis
    - Lead to eventual resolution of COIs
    - Form the core of the future TEMP

- Test & Evaluation is conducted to:
    - Facilitate learning during system development
    - Assess technical maturity of systems
    - Facilitate system integration into fielded forces
    - Address total ownership cost

IT&E Highlights

1. Principal Tool to Measure System Development Progress.

2. Support the Defense Acquisition Process and the User.

3. Conduct to Facilitate Learning.

4. Assess Technical Maturity.

5. Facilitate Integration into Fielded Forces.

6. Confirm Performance.

7. Support the User Through Assessments of a System's Contributions to Mission Capabilities.

8. Begin Early in the Acquisition Process.

Interoperability

- Interoperability requirements identified as Key Performance Parameters (KPP)

- "System-of-systems" management approach
  - Capstone Requirements Documents required by CJCSI 3170.01A
  - MDAs & Testers will ensure thorough understanding of critical system interfaces and flow of consistent/reliable data/information among systems in the battlefield
  - Mutual understanding of key systems in a mission area needed
  - Close cooperation between requirements and acquisition communities a must

- Use of standardized data to facilitate interoperability and information sharing desired

- A disciplined development of highly interoperable systems under one architecture

1999 DSB Report
Major Recommendations

- Establish a Combined Acquisition Force.

- Consolidate Service DT & OT Organizations.

- Establish M&S Oversight & Direction for T&E.

- Centralize T&E Resource Management.

- Ensure T&E Participates in ACTD Process.

- Create a Systems of Systems Design Authority.

- Conduct COTS Software Testing.

Statutory T&E

INFORMATION REQUIRED	MILESTONE A	B	C	FULL RATE PRODUCTION DECISION
Live Fire Waiver		X		
LRIP Quantities		X		
OT Plan	Prior to start of OT&E			
Beyond LRIP Report				X
LFT&E Report				X
Post-Deployment Performance Review				X

NOTE: Sixteen Other Non-T&E Related Areas.

Regulatory T&E

INFORMATION REQUIRED	MILESTONE A	B	C	FULL RATE PRODUCTION DECISION
Validated MNS	X			
Validated ORD		X	X	
Acquisition Strategy	X [1]	X	X	X
Exit Criteria	X	X	X	X [2]
TEMP	X [3]	X	X [4]	X
Independent Technology Assessment		X	X	
Interoperability Certification				X
OT&E Results		X	X	X
Component LFT&E Report		Completion of LFT&E		

NOTE: Nine Other Non-T&E Related Areas

[1] Component Advanced Development (if Program Initiation).
[2] At each other review as well.

[3] Approved by OSD 180 days after MS A.
[4] Update, if necessary.

T&E Implications

- Tendency for More and Smarter T&E Activities.

- Formulation of Sound & Efficient T&E Programs that:

  – Combine T&E Events

  – Share Data

- Require T&E Personnel to be:

  – Involved Early

  – Flexible

  – Adaptable

- Consideration of a Formal Lessons Learned Program.

Modeling and Simulation

- M&S plan shall be documented in coordination with appropriate T&E agencies

- M&S shall be used to make pre-test predictions, and shall be validated with test results

- M&S shall be used in the validation of interoperability

- Models and simulations shall be deliverables

- RFPs shall identify any M&S to be used to evaluate proposals

Implementation Challenges

- Understanding and supporting new acquisition strategies

- Crafting an effective and supportable evaluation strategy at Milestone A

- Defining a "militarily useful capability" early, and evaluating accordingly

- Ensuring that T&E of successive evolutionary blocks are adequately planned and funded

- Integrating the entire test and evaluation community into the new evolutionary acquisition approach

Rewrite Process

- Managed by Defense Acquisition Policy Steering Group (DAPSG)

  - Writing performed by DAPWG

  - All Services and Defense Agencies represented

- Circulated all documents for comment

  - DoDD 5000.1 and DoDI 5000.2 in final coordination (August release)

  - DoD 5000.2-R completing initial coordination/comment (November release)

- Plan to publish interim "admin update" of 1996 5000.2-R to adapt old rules to new Directive and Instruction